

COINCIDENCE MEASUREMENT OF RESIDUE, NEUTRON AND LIGHT CHARGED PARTICLE IN AN SPALLATION EXPERIMENT

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Spallation reactions are important due to their applications in various fields such as astrophysics, neutron sources, accelerator driven systems and production of radioactive beams. To obtain a quantitative understanding of the spallation mechanism large experimental efforts have been done during the last years at the GSI-FRS to study residual nuclei production. These data have led to the improvements of nuclear models but also raised new questions which appeared impossible to answer with inclusive experiments alone. This is why a more complete experiment, called SPALADIN, has been proposed which aims at measuring as exclusively as possible the final states of the spallation reaction. This experiment will be performed at GSI and will study the spallation reaction $^{56}\text{Fe}+p$ in reverse kinematics at 1 GeV/A. beginning by a test on C+p reaction. The detection of the evaporation residues is performed with the ALADIN magnet and various detectors: An ionisation chamber for charge identification, a ring imaging Cerenkov (RICH) for the velocity, high resolution position detectors (drift chambers) for the reconstruction of the magnetic rigidity. The evaporated particles are detected with LAND (neutrons) and with the upgraded MUSIC III (light charged particles) associated with its TOF-wall hodoscope from the ALADIN collaboration. The detection of all the characteristics (type and energy) of the evaporation particles and of the heavy residue will permit to reconstruct the remnant prior to evaporation in mass, charge and excitation energy. It will then be possible to check if the modelisation of the first stage of the reaction is able to predict these characteristics. Furthermore it will allow to study the models describing the various decay modes of the primary residue as evaporation models or Fermi break-up mechanism for the lighter system.

We will present the experimental method including the resolutions and efficiencies of the various detectors. Preliminary data will also be shown.